UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/931,736	08/17/2001	Weiping Shao	469290-76	3038

7590 12/03/2003

CARELLA, BYRNE, BAIN, GILFILLAN,
CECCHI, STEWART & OLSTEIN
6 Becker Farm Road
Roseland, NJ 07068

EXAMINER	
DAVIS, DEBORAH A	

ART UNIT	PAPER NUMBER
1641	

DATE MAILED: 12/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/931,736	SHAO, WEIPING	
	Examiner	Art Unit	
	Deborah A Davis	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 September 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) *19-75* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

1. Applicant's response to the Office Action mailed September 22, 2003 is acknowledged. Currently, claims 1-4 and 8-18 are under consideration for examination. Claims 5-7 are cancelled and Claims 19-75 are withdrawn from consideration.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-4, 8-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dorval et al (USP#5,561,045) in view of Cabilly et al (USP#4,816,567).

Dorval et al teaches a blocked immunoglobulin that has an antibody portion and a Protein A portion, which are used to detect a plurality of analytes (col. 5, lines 47-50). Protein A is bound to the Fc region of an immunoglobulin of a class that specifically binds to a predetermined analyte (col. 4, lines 28-40). Protein A may be immobilized on a support to be used in a test assay to capture binding partners of either the immunoglobulin or Protein A (col. 9, lines 1-12). Both immunoglobulin and the protein will be bound to a support by hydrophobic coupling, but will be free of interaction between them, such as hydrophobic coupling. The antibody portion of the immunoglobulin has at least one antigenic reactive site because both immnoglobulin and the Protein A portion will be free to interact specifically with analytes in a sample

(col. 5, lines 31-40). The preferred supports are plates, polymeric beads, porous membranes (col. 6, lines 35-47). The binding of antibodies to molecular species typically involve the highly specific interaction of the variable portion of the antibody wherein this interaction is responsible for specific recognition by antibodies of foreign substances (col. 5, lines 31-36).

Dorval et al does not teach number of light and heavy chain variable regions of an antibody.

However, Cabilly et al teaches altered and native immunoglobulins that include constant-variable regions that are immunologically capable of binding predetermined antigens (see summary). Cabilly et al teaches that one pair of heavy and light chain is homologous to antibodies raised against one antigen, while other pairs of heavy and light chain is homologous to those raised against another antigen. This results in the ability to bind two antigens simultaneously. The variable region has the advantage the ease of preparation and has good specificity (col. 6, lines 35-68) and their pairs of heavy and light chains can simultaneously react with more than one antigen (col. 15, lines 45-50).

It would have been obvious to one of ordinary skill in the art to modify the teachings of Dorval et al and Sano et al to include altered immunoglobulin antibodies as taught by Cabilly et al that contain variable regions of heavy and light chains because they have high sensitivity and are capable of being reactive to more than one antigen simultaneously. Another advantage is that they are easy to prepare (col. 6, lines 65-66).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sano et al (USP#665,539) in view of Cabilly et al (USP#4,816,567).

Sano et al teaches a blocked immunoglobulin that wherein streptavidin-protein A binds to an antibody portion of its immunoglobulin G-binding domain (col. 1, lines 61-65). The antibody portion of the immunoglobulin contains an antigen-reactive fragment that is able to form an antigen-antibody complex that can comprise of DNA, RNA, fragment, analogue or a derivative (col. 3, lines 1-4). Streptavidin-Protein A comprises at least one protein A compound wherein it binds to biotin (col 4, lines 32-37). Streptavidin-Protein A can be a fragment because Sano et al discloses that any material which is able to specifically recognized or which possesses both antibody-binding domains and also the biotin-binding domains are suitable for use with this present invention (col. 4, lines 22-31).

Dorval et al does not teach number of light and heavy chain variable regions of an antibody.

However, Cabilly et al teaches altered and native immunoglobulins that include constant-variable regions that are immunologically capable of binding predetermined antigens (see summary). Cabilly et al teaches that one pair of heavy and light chain is homologous to antibodies raised against one antigen, while other pairs of heavy and light chain is homologous to those raised against another antigen. This results in the ability to bind two antigens simultaneously. The variable region has the advantage the ease of preparation and has good specificity (col. 6, lines 35-68) and their pairs of heavy and light chains can simultaneously react with more than one antigen (col. 15, lines 45-50).

It would have been obvious to one of ordinary skill in the art to modify the teachings of Dorval et al and Sano et al to include altered immunoglobulin antibodies as taught by Cabilly et al that contain variable regions of heavy and light chains because they have high sensitivity and are capable of being reactive to more than one antigen simultaneously. Another advantage is that they are easy to prepare (col. 6, lines 65-66).

Response to Arguments

6. Applicant's arguments filed September 22, 2003 have been fully considered but they are not persuasive.

7. Applicant's argument that Dorval does not anticipate the claimed invention in that Dorval teaches use of an antibody that has a blocked Fc portion to prevent Protein A

binding is not found persuasive. Dorval anticipates claim one by teaching an immoglobulin wherein protein A is bound to its Fc portion (column 4, lines 29-40), which significantly improves the assay. Dorval teaches that the Fc portion of the immunoglobulin is hydrophobic and by binding a blocking agent to that portion eliminates interference with binding specificity (column 3, lines 12-18).

8. Applicant's argument that Dorval does not anticipate claim 1 as amended is found persuasive but is moot in light of 103 rejections.

9. Applicant's argument that Sano et al does not teach the use of Protein A-Streptavidin is not found persuasive because Protein A binds various antibodies, preferably of the IgG class with high affinity. Sano et al also teaches that Streptavidin-Protein A is a chimeric protein that has a binding affinity for different classes of immunoglobulin (column 4, lines 51-61).

10. Applicant's argument that Sano et al does not anticipate claim 1 as amended is found persuasive but is moot in light of 103 rejections.

11. Applicant's argument that the Examiner has failed to show any motivation to combine the references of Dorval and Sano et al with the reference of Cabilly et al because Cabilly. Applicant's reasons are:

12. Cabilly teaches the production of chimeric antibodies and other synthetic antibodies that will not be disadvantageously immunogenic. Conversely, the disclosures of Dorval and Sano, (and the present application) are directed to immunoglobulins useful in ***in-vitro assay*** procedures so that there is not concern for any immunogenic reactions- these immunoglobulins are not for administration to

animals. This argument is not found persuasive because applicant has claimed a product, specifically a blocked immunoglobulin. What the product is used for is viewed as intended use and will not be given patentable weight. However, the Examiner recognizes that there must be some motivation or suggestion in the prior art to combine art. Although applicant asserts that the reference of Cabilly is concerned with preparing chimeric antibodies that will not be disadvantageously immunogenic, the Examiner relied on other embodiments in the reference for the teaching of heavy and light chain variable regions that can be altered to bind predetermined antigens. In addition Cabilly does teach ***in-vitro*** methods, namely Figure 10 shows a standard curve for ELISA assay utilizing taught antibodies. Therefore the reference of Cabilly et al are maintained.

Conclusion

13. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Deborah A Davis whose telephone number is (703) 308-4427. The examiner can normally be reached on 8-5 Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on (703) 305-3399. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1123.

Deborah A. Davis
CM1, 7D16
November 18, 2003

LONG V. LE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600

11/18/03